

**EPA Superfund
Explanation of Significant Differences:**

**COMMENCEMENT BAY, NEAR SHORE/TIDE FLATS
EPA ID: WAD980726368
OU 23
PIERCE COUNTY, WA
05/09/1995**

**REVISION OF
EXPLANATION OF SIGNIFICANT DIFFERENCES**

INTRODUCTION

Date of Revision of Explanation of Significant Differences (Revised ESD):

March 31, 1995

Site Name and Location:

Tacoma Tar Pits Operable Unit (Tar Pits site)
Commencement Bay-Nearshore/Tideflats Superfund Site
Tacoma, Washington

Lead and Support Agencies:

U.S. Environmental Protection Agency (EPA) -- Lead Agency
Washington State Department of Ecology (Ecology) -- Support Agency

Authorization for Revised ESD:

Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 42 U.S.C. §9617(c), and Section 300.435(c)(2)(i) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

Need for Revised ESD:

On December 20, 1987, EPA signed and issued a Record of Decision (ROD) for the Tar Pits site, located within the Commencement Bay-Nearshore/Tideflats Superfund Site. A number of changes to the remedy described in the ROD were developed based on studies conducted subsequent to the ROD. These changes are discussed in the Explanation of Significant Differences (ESD) dated November 10, 1991, and also in this revised ESD. This revised ESD is necessary because there have been additional changes in the remedy since the ESD was prepared.

Administrative Record:

This Revised ESD will become part of the Administrative Record for the Tar Pits site. The Administrative Record is available at the following locations:

U.S. Environmental Protection Agency
1200 Sixth Avenue, HW-113
Seattle, Washington 98101

Tacoma Public Library
Main Branch
1102 Tacoma Avenue, N.W. Room
Tacoma, Washington 98402

SITE BACKGROUND

A coal gasification plant operated at the Tar Pits site from 1924 to 1956. Waste materials from the coal gasification process, including coal tar liquors, coal ash, and coals tars were disposed on site. The waste compounds included aromatic hydrocarbons, (e.g., benzene and toluene, polynuclear aromatic hydrocarbons (PAHs)(e.g., naphthalene, benzo(a)pyrene), other classes of hydrocarbons, and cyanide). Heavy metals including arsenic, mercury, and lead were also common in the plant waste streams. In 1966, Washington Natural Gas (WNG), the site owner, demolished the plant. Most structures were removed but some demolition debris and below-grade structures, including pipelines containing tars and tank bottoms and foundations, remained.

In 1967, Joseph Simon & Sons (JS&S) began a metal recycling operation at the Tar Pits site. The JS&S operation recycled a variety of metals, including car bodies and electrical transformers. The scrapping of these products released heavy metals and polychlorinated biphenyls (PCBs) on to the surface and the subsurface. Shredded non-metal automobile waste (auto fluff) was also disposed at the site. The auto fluff, consisting primarily of shredded automobile interiors, became fill material at the southern perimeter of the JS&S property as well as for the surrounding property owned by Burlington Northern Railroad Company (BN) and Hygrade Foods Product Corporation (Hygrade).

In 1981, EPA and Ecology discovered tar with a PAH content of 4 percent (40,000 mg/kg) at the Tar Pits site. In 1982, the EPA Field Investigation Team's site inspection lead to an EPA Potential Hazardous Waste Site Preliminary Assessment. In September of 1984, EPA began a Remedial Investigation (RI) which, in November of 1984 as part of an Administrative Order on Consent, was continued and completed by JS&S, WNG, Hygrade, and BN. These parties also prepared a Feasibility Study (FS). The RI/FS was completed in 1987. The ROD was issued by EPA on December 30, 1987. In September 1988, EPA issued a Unilateral Administrative Order (UAO) to WNG and JS&S requiring these parties to implement the remedial design/remedial action (RD/RA) set forth in the ROD.

EPA, with assistance from Ecology, provided oversight during implementation of the remedial activities. In 1991, as a result of an alleged failure of WNG and JS&S to fully comply with the UAO, EPA filed a law suit in Federal District Court to enforce the requirements of the UAO. This action resulted in a settlement pursuant to which WNG has agreed to be responsible for implementing RA at the Tar Pits site.

RA began in June 1992 and Phase I was completed in June 1993. Phases II and III, known as the "Balance of Remediation Activities," commenced in June 1993 and WNG has projected completion in June 1995. The RA requirements are discussed below.

REMEDY SET FORTH IN THE RECORD OF DECISION (ROD)

The RA set forth by the ROD requires the following:

- Excavation and treatment of all contaminated soils considered to be Extremely Hazardous Wastes (EHW), which are defined for the Tar Pits site as exceeding 1 percent (10,000 mg/kg) total PAHs (Ecology Applicable or Relevant and Appropriate Requirement)
- Excavation and treatment (stabilization) of all surface soils (less than 3-foot depth) containing contaminants identified in the ROD (lead, benzene, PCBs, and PAHs) that exceed a 10⁻⁶ lifetime cancer risk level
- Reduction of surface water infiltration and potential human exposure to stabilized soils by capping the stabilized matrix with a low-permeability asphalt cap
- Reduction of surface water transport of contaminants by channeling and managing surface water run-on and run-off
- Provision for continued groundwater monitoring to evaluate the effectiveness of the RA and evaluate the need for potential groundwater extraction and treatment
- Removal and treatment of ponded water to achieve cleanup goals
- Provision for institutional controls to ensure cap integrity and prevent future use of contaminated onsite groundwater.

SIGNIFICANT DIFFERENCES

Nine significant differences from the remedy specified in the ROD were discussed in the ESD. Five of these significant differences have changed in nature since the ESD. In addition, a new significant difference has developed since the ESD, resulting in a total of 10 significant differences from the remedy set forth in the ROD. A discussion of each of the 10 significant differences is provided below, including a summary of each significant difference contained in the ESD and the subsequent changes thereto.

1. Consolidation of Hot Spots from the Peripheral Areas

Summary of Discussion in the ESD:

An extent-of-contamination (EOC) investigation was conducted in April 1990, and an EOC report was prepared in August 1990 (Ebasco, 1990). The purpose of the EOC investigation was to determine the nature and extent of additional contamination beyond the proposed cap area delineated in the ROD. The EOC report indicated that various levels of contaminants identified in the ROD existed in the peripheral areas of the Tar Pits site. Based on review of the EOC report, EPA determined that if the most contaminated soils were removed from the peripheral areas and replaced by clean fill, the ROD action level requirements would be met. It was further concluded that capping of the peripheral areas would not be necessary.

Changes Since the ESD:

There have been no changes to this significant difference since the ESD.

2. Consolidation and Stabilization of Area C, JS&S Operating Area East

Summary of Discussion in the ESD:

The JS&S Operating Area East (OAE) was not specifically identified in the ROD as an area requiring remediation. However, the EOC report (Ebasco, 1990) indicated the presence of contaminated soils in this area. Therefore, remediation of OAE was determined to be necessary by EPA. Such remediation would be similar to that of other peripheral areas such that "hot spots" in the JS&S OAE would be excavated, stabilized, and placed within the cap area identified in the ROD. In addition, OAE would be capped (paved) with a low-permeability material suitable for JS&S operations.

Changes Since the ESD:

There have been no changes to this significant difference since the ESD.

3. Importation of Clean Fill To Place Treated Material Above the Seasonally High Water Table

Summary of Discussion in the ESD:

The ROD specifies that certain material is to be stabilized, and placed back into the excavated areas. However, during remedial design EPA determined that the stabilized material should be placed above the seasonal high groundwater level to reduce the potential for leaching of contaminants from the stabilized material to groundwater. Therefore, EPA also determined that imported clean fill should be placed in excavated areas to raise the bottom of stabilized fill above the seasonal high groundwater level.

Changes Since the ESD:

There have been no changes to this significant difference since the ESD.

4. Modification of Treatability Mixes

Summary of Discussion in the ESD:

The stabilization process generally prescribed by the ROD would include a cement/polymer mix added to a homogenous mixture of soil, auto fluff, and tar in order to produce a stabilized matrix. Bench- and pilot-scale treatability studies were conducted in accordance with the ROD in order to demonstrate the effectiveness of various mixes and allow for the selection of the stabilization process. Review of the treatability study results indicated that not all contaminants required the same level of stabilization in order to meet cleanup criteria for groundwater at the site boundary. Therefore, different stabilization mixes and processes were appropriate for each of the predominant components: auto fluff, tarry soils, and non-tarry soils.

Changes Since the ESD:

Additional treatability studies were conducted subsequent to the ESD in order to select the proper stabilization mix for each of the components at the site. Treatability. The results from these studies are reported in the following documents:

- 1) Batch Plant Demonstration Report (Ebasco, March 1991).
- 2) Phase II Treatability Study (Ebasco, May 1992).
- 3) S-4 Optimization and STC Stabilization Mix Design Report (Ebasco, November 1992).
- 4) S-4 Elimination Treatability Testing & STC Stabilization Mix Design (Ebasco, September 1993).
- 5) Results of Fluff Treatability Optimization Study (Letter from Ebasco to EPA dated February 10, 1993).

Stabilization has been completed. Auto fluff and non-tarry contaminated soil was stabilized in a pug mill using Portland cement as the active stabilization ingredient. Tarry materials were stabilized using a proprietary mixture of ingredients provided by Silicate Technology Corporation (STC). The STC ingredients were mixed with contaminated material in an on-site batch mixer.

5. Change in the Leaching Requirements

Summary of Discussion in the ESD:

In order to meet the post-remediation cleanup criteria established in the ROD, the leaching requirements and treatment levels were modified to take into consideration the final Batch Plant Demonstration Report (Ebasco, 1991), the Dilution/Attenuation Factor (DAF) Quantification report (Ebasco, 1991), available bench scale treatment data, and attenuation characteristics. Additional treatability testing at both bench and batch scales were planned to further optimize mix constituents.

Maximum values for leaching characteristics (TCLP) were established for each of the parameters set forth in the ROD, using information obtained in the following documents:

- 1) Dilution/Attenuation Factor Quantification Report (Ebasco, April 1991).
- 2) Bench-Scale Treatability Study Report (Ebasco, January 1990).
- 3) Bench-Scale Screening Study (Ebasco, November 1990).
- 4) Batch Plant Demonstration Report (Ebasco, March 1991).
- 5) Final Framework for Remediation Document (WNG, September 1991).

The maximum leaching values (TCLP) for stabilized material are as follows:

- Tarry Materials: Lead, 650 ug/l
PCBs, 2.6 ug/l
ROD PAHs (total), 390 ug/l
ROD PAHs (individual compounds), 65 ug/l
Benzene, 500 ug/l
- Soils and auto fluff: Lead, 5000 ug/l
PCBs, 20 ug/l
ROD PAHs (total), 3000 ug/l
ROD PAHs (individual compounds), 500 ug/l
Benzene, 500 ug/l

In addition, groundwater monitoring performed during the implementation of, and following, the RA was required to determine the long-term effectiveness of the remedial action. As provided in the ROD, an expanded groundwater monitoring system has been designed and installed at the site. Pre-remediation groundwater quality data was collected during the RA. Groundwater and surface water data will continue to be collected after the RA is complete. The ROD states that if cleanup levels are not achieved in the aquifers at the site boundary within a reasonable period of time following completion of RA, and during a subsequent 2-year monitoring period, alternative RAs are to be evaluated and additional RA is to be implemented. Groundwater extraction and treatment is one such alternative.

Changes Since the ESD:

The maximum leaching criteria discussed in the ESD have not changed. However, treatment mixtures have changed based on treatability results, as discussed for significant difference No. 4 above.

6. Increase in the Volume of Material to be Treated

Summary of Discussion in the ESD:

According to the ROD, an estimated 45,000 cubic yards (yd³) of material would be excavated and stabilized at the site. This estimate assumed "areas of clean" within the proposed cap boundary, and did not account for additional contaminated material in the peripheral, and JS&S operating areas. Based on post RI/FS characterization of the site within the cap area and data from the EOC report, the excavation/stabilization volume estimate was revised to 78,600 yd³, including soil, auto fluff, and tar. This volume estimate was subject to revision based on additional testing conducted during the excavation of "hot spots", or as previously unknown EHW (i.e. tarry materials with a PAH content above 1 percent [10,000 mg/kg]) was identified.

Changes Since the ESD:

Excavation and stabilization is complete. Because of the expansion of "hot spot" excavations and identification and excavation of more EHW tarry material than originally estimated (based on testing and visual observation), a total of 185,170 yds³ of soil, auto fluff, and tar was excavated and stabilized. Another 14,869.78 tons (11,335.61 hazardous and 3,534.17 nonhazardous) were disposed at offsite landfills (offsite disposal included over-size debris too large to stabilize and residual soil

from batch mix plant cleanup).

7. Increase in Cap Area

Summary of Discussion in the ESD:

A cap area of approximately 75,000 square yard (yd²) was specified in the ROD. The cap area was to be expanded to include an additional surface area up to a total of approximately 100,000 yd², if necessary. The capped area was to include the entire JS&S operating area.

Changes Since the ESD:

There have been no changes to this significant difference since the ESD.

8. Increase in Capital Cost for Remediation

Summary of Discussion in the ESD:

At the time of the ESD, the estimated capital cost for the RA was \$15 to \$18 million, an increase from the \$3.4 million estimate in the ROD. The major components affecting cost included increases in: the unit cost of remediation and chemical additives, the volume of material to be stabilized, the capped area, the associated materials handling effort, and the scope for the engineering and management of the project.

Changes Since the ESD:

The estimated capital cost for the RA has increased to approximately \$37 million. As was the case with the cost increase explained in the ESD, the cost increase is primarily the result of extra costs associated with excavation and stabilization of the additional volume of material (see significant difference No. 6 for a discussion of the volume increase).

9. Change in Remediation Schedule

Summary of Discussion in the ESD:

In September 1988, EPA issued the UAO to WNG requiring implementation of the remedy set forth in the ROD. The UAO required completion of construction of the RA by September 1990. The UAO was amended on June 6, 1989, with a new schedule requiring completion of the RA by September 26, 1991. The schedule was revised again when EPA and WNG entered into the Consent Decree in February 1992. The schedule in the settlement specified that remediation was to have been completed by November 1, 1993. However, the settlement allowed for a third construction season as a contingency; the third construction season and RA was to have been completed by the end of 1994.

Changes Since the ESD:

EPA approved an extension of the schedule in a letter dated August 16, 1993. The extended schedule allowed use of the contingency construction year and designated December 31, 1994 as the RA completion date. The schedule was extended primarily because of the increase in excavation and stabilization volumes (see significant difference No. 6 for a discussion of the volume increase). At this time, remediation is not yet complete; however, WNG has committed to completion of the remediation by June 30, 1995 (WNG letter to EPA dated January 12, 1995).

10. Addition of a Multi-Layered Geosynthetic Cover and Cement Concrete Pavement

This significant difference has developed since the ESD. The ROD specifies that a low-permeability asphalt cap be installed over the stabilized waste. However, concerns regarding the ability to meet the permeability requirement (1×10^{-7} cm/s) on the side slopes of the waste pile and the long-term durability of asphalt pavement led to the use of a multi-layered geosynthetic cover for the waste pile area (Ebasco, August 19, 1994; September 1994a; and September 1994b). Also, JS&S had concerns about the long-term wearability of asphalt pavement in parts of the JS&S operating area; therefore, cement concrete pavement was constructed in certain areas of the JS&S areas. Low-permeability asphalt pavement was installed in other portions of the JS&S areas and around the waste pile perimeter. All of the paving alternatives, including the geosynthetic cap, have been designed, installed and tested to meet the permeability requirements specified in the ROD.

Ecology has been informed of the developments in the RA approach and has had an opportunity to comment on project documents, including this Revised ESD. Ecology concurs with this Revised ESD.

AFFIRMATION OF STATUTORY DETERMINATIONS

After consideration of the new information developed subsequent to the ROD, EPA and Ecology have determined that the changes to the remedy will continue to provide for the protection of human health and the environment. The remedy continues to be cost effective and uses permanent solutions to the maximum extent practicable for this site. The remedy is also in compliance with the NCP, and Federal and State requirements identified in the ROD that are applicable or relevant and appropriate to this RA.

PUBLIC PARTICIPATION ACTIVITIES

A notice of the approval and issuance of the Revised ESD will be published in the Tacoma News Tribune. This Revised ESD, the supporting information, and EPA's response to any comments from the public will become part of the Administrative Record for the Tar Pits site. For additional information regarding this Revised ESD, please Contact the Superfund Site Manager for the Tar Pits site:

Lee Marshall
1200 Sixth Avenue, HW-113
Seattle, Washington 98101
(206) 553-2723

APPROVED:

DATE:

Randall F. Smith
Director
Hazardous Waste Division

REFERENCES

- Ebasco, January 1990. Bench-Scale Treatability Study Report.
- Ebasco, November 1990. Bench-Scale Screening Study.
- Ebasco, November 1990. Extent of Contamination Field Study.
- Ebasco, March 1991. Batch Plant Demonstration Report.
- Ebasco, April 1991, Dilution/Attenuation Factor Quantification.
- Ebasco, May 1992. Phase II Treatability Study.
- Ebasco, November 1992. S-4 Optimization and STC Stabilization Mix Design.
- Ebasco, February 10, 1993. Letter addressing results of Fluff Treatability Optimization Study. Letter from A. Rossi/Ebasco to L. Marshall/EPA.
- Ebasco, September 1993. S-4 Elimination Treatability Testing & STC Stabilization Mix Design.
- Ebasco, August 19, 1994. Technical Memorandum Waste Pile Cover Design, Revision 1.
- Ebasco, September 1994a. Design Drawings for the Waste Pile Alternative Cover.
- Ebasco, September 1994b. Technical Specifications for the Waste Pile Alternative Cover.
- Environmental Protection Agency, November 1, 1991. Explanation of Significant Differences for the Tacoma Tar Pits Site.
- Washington Natural Gas Co., September 1991. Final Framework for Remediation Document.
- Washington Natural Gas Co., January 12, 1995. Letter addressing schedule for remaining RA work. From T Hogan/WNG to R. Mednick/EPA.
- Washington Natural Gas Co., September 28, 1994 and March 17, 1995. Memoranda from Matthew Dalton with preliminary cost projections.